

CLAIMS

1. An electrode composite body for redox capacitors, comprising a conductive polymer and an electrode.
2. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 further comprises an ionic liquid.
3. An electrode composite body for redox capacitors, wherein the conductive polymer according to claim 1 further comprises an ionic liquid, and the conductive polymer according to claim 1 comprises as a dopant the same anion as an anionic component contained in the ionic liquid.
4. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 is prepared by electrolytic polymerization.
5. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 is prepared by electrolytic polymerization in the presence of an ionic liquid.
6. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 is prepared by electrolytic polymerization in the presence of an ionic liquid containing as a component at least one ion selected from sulfonic acid anion ($-\text{SO}_3^-$), carboxylato ($-\text{COO}^-$), and BF_4^- .

7. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 is prepared by electrolytic polymerization in the presence of an organic solvent.
8. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to any one of claims 1 to 7 is at least one selected from polypyrrole, polythiophene, polyquinone, derivatives of these polymers, and polymers prepared by polymerizing an amino-group-containing aromatic compound.
9. The electrode composite body for redox capacitors according to claim 1, wherein the conductive polymer according to claim 1 is carried on the surface of the electrode according to claim 1.
10. The electrode composite body for redox capacitors according to claim 9, wherein the electrode according to claim 9 comprises a carbon material.
11. An electrode composite body for redox capacitors, comprising a conductive polymer film and an electrode.
12. The electrode composite body for redox capacitors according to claim 11, wherein the thickness of the conductive polymer film according to claim 11 in a state of actual use is 0.1 to 1,000 μm .
13. The electrode composite body for redox capacitors according to claim 11, wherein the thickness of the

conductive polymer film according to claim 11 when the conductive polymer film is dried at 25°C for 48 hours is 0.05 to 500 µm.

14. An electrolyte for redox capacitors comprising an ionic liquid as an essential component.

15. A redox capacitor comprising an electrolyte containing an ionic liquid as an essential component and the electrode composite body for redox capacitors according to any one of claims 1 to 13.

16. The redox capacitor according to claim 15, wherein the electrolyte essentially containing an ionic liquid according to claim 15 comprises sulfonic acid anion (-SO₃⁻), carboxylato (-COO⁻), or BF₄⁻.

17. The redox capacitor according to claim 15, wherein the electrolyte essentially containing an ionic liquid according to claim 15 further comprises an organic solvent.

18. The redox capacitor according to claim 17, wherein the weight ratio (A) / (B) of the organic solvent (A) to the ionic liquid (B) is 5 or less.

19. The redox capacitor according to any one of claims 15 to 18, the redox capacitor including at least an ionic liquid and a conductive polymer that use all or some of oxidation-reduction of an electrode material, charge-and-discharge in the electric double layer, and adsorption and desorption of ions on the surface of an electrode for

storing-and-discharging electric energy, wherein a doping-dedoping reaction of the conductive polymer is performed in the ionic liquid solution.

20. A composite body of an electrolyte according to claim 14 and electrodes used for the redox capacitor according to any one of claims 15 to 19 that includes at least an ionic liquid and the conductive polymer and that uses the doping-dedoping reaction of the conductive polymer, wherein the anionic component contained in the ionic liquid is the same component as a part of the dopant of the conductive polymer.

21. The composite body according to claim 20, wherein at least one electrode comprises an electrode prepared by combining a polypyrrole film.